

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
8 January 2004 (08.01.2004)

PCT

(10) International Publication Number
WO 2004/002416 A3

(51) International Patent Classification⁷: **A61K 48/00**,
C12N 15/00, C07H 21/04, 21/02

[US/US]; 6514 Liptak Drive, Harrisburg, PA 17112-3394
(US). **THIBOUTOT, Diane** [US/US]; 823 Linden Road,
Hershey, PA 17033 (US).

(21) International Application Number:
PCT/US2003/020340

(74) Agent: **FRASER, Janis, K.**; Fish & Richardson, 225
Franklin Street, Boston, MA 02110-2804 (US).

(22) International Filing Date: 26 June 2003 (26.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/391,795 26 June 2002 (26.06.2002) US
60/417,997 14 October 2002 (14.10.2002) US
60/449,066 21 February 2003 (21.02.2003) US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier applications:

US 60/391,795 (CIP)
Filed on 26 June 2002 (26.06.2002)
US 60/417,997 (CIP)
Filed on 14 October 2002 (14.10.2002)
US 60/449,066 (CIP)
Filed on 21 February 2003 (21.02.2003)

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **THE
PENN STATE RESEARCH FOUNDATION** [US/US];
304 Old Main, University Park, PA 16802-7000 (US).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **CLAWSON, Gary**,
A. [US/US]; 5709 Rockmere Drive, Bethesda, MD
20816 (US). **PAN, Wei-Hua** [US/US]; 907 Butler Court,
Hummelstown, PA 17036 (US). **CHRISTENSEN, Neil**

(88) Date of publication of the international search report:
3 February 2005

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: METHODS AND MATERIALS FOR TREATING HUMAN PAPILLOMAVIRUS INFECTIONS

(57) Abstract: The invention provides methods and materials related to treating HPV infections (e.g., HPV infections of cutaneous and mucosal epithelial cells) and HPV-associated conditions (e.g., cervical dysplasia, HPV-associated cervical carcinomas, oral mucosal papilloma cancers, laryngeal papilloma cancers).

WO 2004/002416 A3

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US03/20340

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 48/00; C12N 15/00; C07H 21/04, 21/02

US CL : 435/375, 377; 536/23.1, 24.1, 24.5

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/375, 377; 536/23.1, 24.1, 24.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
STIC SEQ SEARCH, MEDLINE, BIOSIS, BIOTECHNO, CAPLUS**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------|
| Y | WO 00/09673 A1 (JOHNSON & JOHNSON RESEARCH PTY LIMITED) 24 February 2000(24.02.2000), see entire document. but especially Figure 1 for SEQ ID NO: 4 and claim for SEQ ID NO: 68. | 1-19, 40-44, 50-55 |
| Y | WO 00/60115 A2 (CITY OF HOPE) 12 October 2000(20.10.2000), see entire document, but especially page 6 for SEQ ID NO: 51. | 1-19, 40-44, and 50-55 |
| Y | US 6,326,174 B1 (JOYCE et al.) 04 December 2001, see entire document. | 1-19, 40-44, and 50-55 |
| Y | US 6,174,870 B1 (CROOKE et al.) 16 January 2001(16.01.2001), see entire document. | 1-19, 40-44, and 50-55 |
| Y | LIEBER et al. Selection of Efficient Cleavage sites in Target RNAs by Using a Ribozyme Expression Library. Molecular and Cellular Biology. January 1995, Vol. 15, No. 1, pages 540-551, see entire document. | 1-19, 40-44 and 50-55 |
| Y | CHEN et al. Effectiveness of Three Ribozymes for Cleavage of an RNA Transcript from Human Papillomavirus Type 18. 1995, Vol. 2, No. 4, pages 263-271, see entire document. | 1-19, 40-44, and 50-55 |

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

22 November 2004 (22.11.2004)

Date of mailing of the international search report

26 NOV 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Sean R. McGarry

Telephone No. (571) 272-1600

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/0340

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-19, 40-44 (SEQ ID NOS: 4, 51, and 68), and 50-55
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☒

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.